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10/563,987	01/10/2006	Sumihito Sago	126249	7109

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EXAMINER	
ABRAHAM, AMJAD A	
ART UNIT	PAPER NUMBER
1744	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/563,987	SAGO ET AL.	
	Examiner	Art Unit	
	AMJAD ABRAHAM	1744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 September 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-8,10,20-22 and 24-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-8,10,20-22 and 24-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This is a final office action in response to applicant's remarks and amendments, filed on September 20, 2010 have been carefully considered. Claims 1 and 7 has been amended. Claims 5 and 9 have been canceled. Claims 25-28 have been added as new claims. Therefore, claims 1-4, 6-8, 10, 20-22 and 24-28 are now pending review in this action.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1, 3-4, 6, 20-22, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Janjic (USP No. 3,934,348) in view of Brodkin et al. (USP No. 6,428,614) in view Sozio et al. (USP No. 4,585,417) in further view of Toussaint (USP No. 3,619,240).

4. Regarding claim 1, Janjic teaches a method for manufacturing a dental prosthesis. **(See abstract)**.

a. Janjic further teaches

i. A step of preparing a substrate of the dental prosthesis that is constituted by a dental molding material. **(See three metallic layers that together comprise the substrate in figures 3-5 and abstract.)**

(1) According to applicant- any material can be used as the substrate. **(See page 14 of applicant's specification- paragraph [0036])**.

ii. A step of forming a back coating layer on the substrate of a first **(opaque)** porcelain. **(See figure 8 and volume 1 lines 48-54)**.

(2) One having the ordinary skill in the art would know that porcelain is made of ceramic material.

iii. A step of forming a casting mold **(die mold- See column 1 lines 33-38 disclosing that the dentist forms a mold from hard dental plaster.)** and having the substrate and the back coating layer being disposed in the casting mold such that a void is provided on the back

coating layer. **(See figure 2 which shows a molding die with a female and male part)**.

(3) Also see figures 3-6 showing the substrate and back coating being disposed in the die mold (cast mold).

(4) Casting is defined to give a shape to (a substance) by pouring in liquid or plastic form into a mold and letting harden without pressure. **(Merriam-Webster Online Dictionary)**.

iv. A step of forming a cast coating layer **(Regular Porcelain Layer)** on the back coating layer **(Opaque Porcelain Layer)** by applying the regular porcelain into the void of the casting mold.

b. With respect to claims 1, Janjic does not explicitly teach wherein the second porcelain **(regular porcelain)** is constituted by ceramic whose composition is different from that of the ceramic material of the first porcelain **(opaque porcelain)**, such that the viscosity of the second porcelain is lower than that of the first porcelain at the same casting temperature. Furthermore, Janjic is silent as to how the regular porcelain layer (second porcelain layer) is added to the first layer. Specifically, Janjic does not teach wherein the mold includes a passage for introducing the second porcelain under pressure using a casting mold heated to a casting temperature and wherein the second porcelain is introduced by using a ceramic holding portion which is part of the casting mold.

c. However, Brodkin teaches an example in which a regular porcelain layer (Body and Incisal Porcelain) is placed over opaque porcelain. **(See column 7**

lines 1-4). Although Brodkin is silent to the viscosity differential between the regular and opaque porcelain, Brodkin teaches in table 3 examples of the composition of the regular porcelain (Body and Incisal) and the opaque porcelain. **(See table 3 in column 3 of Brodkin)**. These compositions fit the claimed (see applicant's claim 5) range for the porcelain layers provided by applicant as an example of the porcelain composition which would have the claimed viscosity characteristics.

v. For example, Brodkin teaches wherein the regular/Body porcelain (2^{nd} porcelain layer) has a SiO2 (59-65%), AlO3 (10-15%), K2O (15-17%), Na2O (4-6%), Li2O (1.5-3%), CaO (0.5-2), MgO (non-essential—see table 6 showing .8%) and an opaque layer (1^{st} porcelain layer) having a SiO2 (59-65%), AlO3 (10-15%), K2O (15-17%), Na2O (4-6%), Li2O (1.5-3%). **(See Table 3 and table 6 of Brodkin)**.

vi. It would have been obvious to ones skilled in the art to modify Janjic with the teachings of Brodkin for the benefit of a dual layer ceramic which has different physical properties. The compounds are well known for use in making ceramic dental components. One having the ordinary skill in the art of making dental ceramics would know to alter these metal oxide compositions in order to change a physical property like that of viscosity.

d. The motivation for controlling the viscosity of the base layer ((1st porcelain layer) and a coating layer (2nd porcelain layer) is seen in the teachings of Toussaint. **(See column 3 lines 40-50)**.

vii. Toussaint teaches that in general, the degree of strengthening achieved with an given base layer and a glass coating will depend on the viscosities of the two elements at the time they are joined together and for maximum results the viscosity of the coating (2nd layer) should be as low as possible, and the base layer (1st layer) should be as high as possible. **(See column 3 lines 40-50)**. Having the teachings of Toussaint, one having the ordinary skill in the art at the time of the invention would have adjusted the composition of the porcelain layers of Janjic/Brodkin for the benefit of ensuring the viscosity differential between the two layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)*.

e. With respect to claims 1, the combination of Janjic and Brodkin do not teach how the regular porcelain layer (second porcelain layer) is added to the first layer. Specifically, Janjic does not teach wherein the mold includes a passage for introducing the second porcelain under pressure using a casting mold heated to a casting temperature and wherein the second porcelain is introduced by using a ceramic holding portion which is part of the casting mold.

f. However, Sozio teaches a modified mold which has ceramic holding portion (part 44 of figure 4) which can hold ceramic material (ingot or disc) which is heated and injected (under pressure using a plunger) into the cavity of a mold through a porcelain introducing passage (part 48 of figure 4). **(See figure 4 and column 9 line 47 to column 10 line 16)**.

viii. It would have been obvious to one having the ordinary skill in the art to combine Janjic and Sozio for the benefit of ensuring that the entire casting space is filled with dental material such as ceramic/porcelain compositions.

5. Regarding claim 3, Janjic teaches wherein the substrate is made of metal. **(See column 1 lines 30-43 and figures 3-5)**.

6. Regarding claims 4 and 6, Janjic does not expressly teach wherein the 1st porcelain is provided by porcelain whose viscosity as the casting temperature is at least 1.5 times as high as that of the 2nd porcelain and wherein the 1st porcelain viscosity is 2 X 10^6 to 5 X 10^7 cp and the 2nd porcelain is 1 X 10^6 to 3 X 10^7 cp.

ix. However as described above, Brodkin teaches wherein the regular/Body porcelain (2nd porcelain layer) has a SiO2 (59-65%), AlO3 (10-15%), K2O (15-17%), Na2O (4-6%), Li2O (1.5-3%), CaO (0.5-2), MgO (non-essential—see table 6 showing .8%) and an opaque layer (1st porcelain layer) having a SiO2 (59-65%), AlO3 (10-15%), K2O (15-17%), Na2O (4-6%), Li2O (1.5-3%). **(See Table 3 and table 6 of Brodkin)**.

g. The motivation for controlling the viscosity of the base layer ((1st porcelain layer) and a coating layer (2nd porcelain layer) is seen in the teachings of Toussaint. **(See column 3 lines 40-50)**.

x. Toussaint teaches that in general, the degree of strengthening achieved with an given base layer and a glass coating will depend on the viscosities of the two elements at the time they are joined together and for maximum results the viscosity of the coating (2nd layer) should be as low as possible, and the base layer (1st layer) should be as high as possible. **(See column 3 lines 40-50)**. Having the teachings of Toussaint, one having the ordinary skill in the art at the time of the invention would have adjusted the composition of the porcelain layers of Janjic/Brodkin for the benefit of ensuring the viscosity differential between the two layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)*.

7. Regarding claims 20-21, Janjic does not explicitly teach: (1) wherein the step of forming the back coating layer, the first porcelain layer is burned at a burning temperature of 900 to 1100 C and (2) wherein the step of forming the cast coating layer, the second porcelain is softened at a heating temperature of 800 to 1200 C.

h. However, Janjic does teach that the first (opaque) layer is baked starting at 800 F to 1825 F (430C to 1000 C). In addition, the second layer (regular) is baked at a temperature of 800 F to 1700 F. **(See column 1 lines 47-63)**.

i. It would have been obvious to one having the ordinary skill in the art at the time of the invention to adjust the casting temperature for the intended application, since it has been held that discovering the optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)*.

8. Regarding claim 22, Janjic teaches that the cast coating layer (regular) is formed and covers the entire surface of the back coating layer (opaque). **(See figures 7 and 9)**.

9. Regarding claims 25 and 26, the combination of Janjic and Brodkin do not teach wherein the ratio of SIO2 to AL2O3 or Na2O3 is lower in the second porcelain layer to the first porcelain layer.

j. However, it would have been obvious to one having the ordinary skill in the art that the viscosity can be experimented with to arrive to the claimed viscosity differentials. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The motivation for controlling the viscosity of the base layer ((1st porcelain layer) and a coating layer (2nd porcelain layer) is seen in the teachings of Toussaint. **(See column 3 lines 40-50)**.

xi. Toussaint teaches that in general, the degree of strengthening achieved with an given base layer and a glass coating will depend on the viscosities of the two elements at the time they are joined together and for maximum results the viscosity of the coating (2nd layer) should be as low

as possible, and the base layer (1st layer) should be as high as possible. **(See column 3 lines 40-50)**. Having the teachings of Toussaint, one having the ordinary skill in the art at the time of the invention would have adjusted the composition of the porcelain layers of Janjic/Brodkin for the benefit of ensuring the viscosity differential between the two layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)*.

10. Claims 2 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Janjic (USP No. 3,934,348) in view of Brodkin et al. (USP No. 6,428,614) in view Sozio et al. (USP No. 4,585,417) in further view of Toussaint (USP No. 3,619,240) in further view of *Fukuda et al. (Japanese Patent Publication 06-269466—made of record by the applicant)*.

11. Regarding claim 2, the combination of Janjic, Brodkin, and Sozio does not teach wherein the casting mold forming step includes: (1) a sub-step of forming, on at least a part of the surface of the back coating layer, a model layer made of a material that is eliminable by burning thereof, (2) a sub-step of embedding the model layer in a matrix constituting the casting mold; and a (3) sub-step of forming the casting mold, which is provided with the void corresponding to the model layer, by burning and eliminating the model layer after hardening the matrix.

k. However, Fukuda discloses this process which mimics the well known lost wax molding process. Fukuda discloses a process for forming an model layer of wax (32) onto the back coating layer **(1st casting layer- part # 31)**. Fukuda further discloses the embedding the model layer into a casting mold and burning the wax material leaving the 1st casting material in a casting mold. **(See drawings 3-4 and paragraphs [0036-0037])**.

l. Janjic and Fukuda are analogous art because they are from the same field of endeavor which is casting porcelain layers onto a substrate. At the time of the invention, it would have been obvious to one having the ordinary skill in the art to use the lost wax molding process to dispose of the porcelain layer and substrate into a casting mold. Lost wax molding is well known in the art, specifically in the use of making dental prosthesis.

12. Regarding claim 24, the combination of Janjic and Sozio does not teach wherein the model layer is formed to have a configuration corresponding to the configuration of the cast coating layer.**(See drawing 4- showing the cavity that is left after burning the material in which the cast coating layer is added to)**.

m. Janjic and Fukuda are analogous art because they are from the same field of endeavor which is casting porcelain layers onto a substrate. At the time of the invention, it would have been obvious to one having the ordinary skill in the art to use the lost wax molding process to dispose of the porcelain layer and substrate into a casting mold. Conventional lost wax molds are created sp that the burned out portion leaves the desired mold cavity.

1. Claims 7-8, 10, and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brodkin et al. (USP No. 6,428,614) in view of Toussaint (USP No. 3,619,240).

2. Regarding claims 7-8 and 10, Brodkin teaches a dental restoration comprising a metal core (substrate), with first porcelain (opaque layer) and second porcelain (body/regular layer) layered thereon. **(See column 11 lines 23 to column 12 lines 4 and column 7 lines 1-5)**.

a. Moreover, Brodkin teaches an example in which a regular porcelain layer (Body and Incisal Porcelain) is placed over an opaque porcelain. **(See column 7 lines 1-4)**. Although Brodkin is silent to the viscosity differential between the regular and opaque porcelain, Brodkin teaches in table 3 examples of the composition of the regular porcelain (Body and Incisal) and the opaque porcelain. **(See table 3 in column 3 of Brodkin)**. These compositions fit the claimed (see applicant's claim 5) range for the porcelain layers provided by applicant as an example of the porcelain composition which would have the claimed viscosity characteristics.

i. For example, Brodkin teaches wherein the regular/Body porcelain (2^{nd} porcelain layer) has a SiO2 (59-65%), AlO3 (10-15%), K2O (15-17%), Na2O (4-6%), Li2O (1.5-3%), CaO (0.5-2), MgO (non-essential—see table 6 showing .8%) and an opaque layer (1^{st} porcelain layer) having a SiO2

(59-65%), AlO3 (10-15%), K2O (15-17%), Na2O (4-6%), Li2O (1.5-3%). **(See Table 3 and table 6 of Brodkin)**.

b. The motivation for controlling the viscosity of the base layer ((1st porcelain layer) and a coating layer (2nd porcelain layer) is seen in the teachings of Toussaint. **(See column 3 lines 40-50)**.

ii. Toussaint teaches that in general, the degree of strengthening achieved with an given base layer and a glass coating will depend on the viscosities of the two elements at the time they are joined together and for maximum results the viscosity of the coating (2nd layer) should be as low as possible, and the base layer (1st layer) should be as high as possible. **(See column 3 lines 40-50)**. Having the teachings of Toussaint, one having the ordinary skill in the art at the time of the invention would have adjusted the composition of the porcelain layers of Janjic/Brodkin for the benefit of ensuring the viscosity differential between the two layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)*.

3. Regarding claims 27-28, Brodkin does not teach wherein the ratio of SIO2 to AL2O3 or Na2O3 is lower in the second porcelain layer to the first porcelain layer.

c. However, it would have been obvious to one having the ordinary skill in the art that the viscosity can be experimented with to arrive to the claimed viscosity differentials. "[W]here the general conditions of a claim are disclosed in

the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The motivation for controlling the viscosity of the base layer ((1st porcelain layer) and a coating layer (2nd porcelain layer) is seen in the teachings of Toussaint. **(See column 3 lines 40-50)**.

iii. Toussaint teaches that in general, the degree of strengthening achieved with an given base layer and a glass coating will depend on the viscosities of the two elements at the time they are joined together and for maximum results the viscosity of the coating (2nd layer) should be as low as possible, and the base layer (1st layer) should be as high as possible. **(See column 3 lines 40-50)**. Having the teachings of Toussaint, one having the ordinary skill in the art at the time of the invention would have adjusted the composition of the porcelain layers of Janjic/Brodkin for the benefit of ensuring the viscosity differential between the two layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)*.

13. Claims 7-8, 10, and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Janjic (USP No. 3,934,348) in view of Brodkin et al. (USP No. 6,428,614) in view of Toussaint (USP No. 3,619,240).

14. Regarding claims 7, Janjic teaches a method for manufacturing a dental prosthesis. **(See abstract)**.

n. Janjic further teaches

xii. A step of preparing a substrate of the dental prosthesis that is constituted by a dental molding material. **(See three metallic layers that together comprise the substrate in figures 3-5 and abstract.)**

(5) According to applicant- any material can be used as the substrate. **(See page 14 of applicant's specification- paragraph [0036])**.

xiii. A step of forming a back coating layer on the substrate of a first **(opaque)** porcelain. **(See figure 8 and volume 1 lines 48-54)**.

(6) One having the ordinary skill in the art would know that porcelain is made of ceramic material.

xiv. A step of forming a casting mold **(die mold- See column 1 lines 33-38 disclosing that the dentist forms a mold from hard dental plaster.)** and having the substrate and the back coating layer being disposed in the casting mold such that a void is provided on the back coating layer. **(See figure 2 which shows a molding die with a female and male part)**.

(7) Also see figures 3-6 showing the substrate and back coating being disposed in the die mold (cast mold).

(8) Casting is defined to give a shape to (a substance) by pouring in liquid or plastic form into a mold and letting harden without pressure. **(Merriam-Webster Online Dictionary)**.

xv. A step of forming a cast coating layer **(Regular Porcelain Layer)** on the back coating layer **(Opaque Porcelain Layer)** by applying the regular porcelain into the void of the casting mold.

o. With respect to claims 7, Janjic does not explicitly teach wherein the second porcelain **(regular porcelain)** is constituted by ceramic whose composition is different from that of the ceramic material of the first porcelain **(opaque porcelain)**, such that the viscosity of the second porcelain is lower than that of the first porcelain at the same casting temperature. Furthermore, Janjic is silent as to how the regular porcelain layer (second porcelain layer) is added to the first layer. Specifically, Janjic does not teach wherein the mold includes a passage for introducing the second porcelain under pressure using a casting mold heated to a casting temperature and wherein the second porcelain is introduced by using a ceramic holding portion which is part of the casting mold.

p. However, Brodkin teaches an example in which a regular porcelain layer (Body and Incisal Porcelain) is placed over an opaque porcelain. **(See column 7 lines 1-4)**. Although Brodkin is silent to the viscosity differential between the regular and opaque porcelain, Brodkin teaches in table 3 examples of the composition of the regular porcelain (Body and Incisal) and the opaque porcelain. **(See table 3 in column 3 of Brodkin)**. These compositions fit the claimed (see

applicant's claim 5) range for the porcelain layers provided by applicant as an example of the porcelain composition which would have the claimed viscosity characteristics.

xvi. For example, Brodkin teaches wherein the regular/Body porcelain (2nd porcelain layer) has a SiO2 (59-65%), AlO3 (10-15%), K2O (15-17%), Na2O (4-6%), Li2O (1.5-3%), CaO (0.5-2), MgO (non-essential—see table 6 showing .8%) and an opaque layer (1st porcelain layer) having a SiO2 (59-65%), AlO3 (10-15%), K2O (15-17%), Na2O (4-6%), Li2O (1.5-3%). **(See Table 3 and table 6 of Brodkin)**.

q. The motivation for controlling the viscosity of the base layer ((1st porcelain layer) and a coating layer (2nd porcelain layer) is seen in the teachings of Toussaint. **(See column 3 lines 40-50)**.

xvii. Toussaint teaches that in general, the degree of strengthening achieved with an given base layer and a glass coating will depend on the viscosities of the two elements at the time they are joined together and for maximum results the viscosity of the coating (2nd layer) should be as low as possible, and the base layer (1st layer) should be as high as possible. **(See column 3 lines 40-50)**. Having the teachings of Toussaint, one having the ordinary skill in the art at the time of the invention would have adjusted the composition of the porcelain layers of Janjic/Brodkin for the benefit of ensuring the viscosity differential between the two layer, since it has been held that discovering an optimum value of a result effective

variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)*.

15. Regarding claims 8 and 10, Janjic does not expressly teach wherein the 1st porcelain is provided by porcelain whose viscosity as the casting temperature is at least 1.5 times as high as that of the 2nd porcelain and wherein the 1st porcelain viscosity is 2 X 10^6 to 5 X 10^7 cp and the 2nd porcelain is 1 X 10^6 to 3 X 10^7 cp.

xviii. However as described above, Brodkin teaches wherein the regular/Body porcelain (2nd porcelain layer) has a SiO2 (59-65%), AlO3 (10-15%), K2O (15-17%), Na2O (4-6%), Li2O (1.5-3%), CaO (0.5-2), MgO (non-essential—see table 6 showing .8%) and an opaque layer (1st porcelain layer) having a SiO2 (59-65%), AlO3 (10-15%), K2O (15-17%), Na2O (4-6%), Li2O (1.5-3%). **(See Table 3 of Brodkin)**.

xix. *As the same compositions are present in Brodkin as claimed by applicant the viscosity must also be different with the regular porcelain layer having a lower viscosity than the opaque layer.*

xx. It would have been obvious to ones skilled in the art to modify Janjic with the teachings of Brodkin for the benefit of a dual layer ceramic which has different physical properties. The compounds are well known for use in making ceramic dental components. One having the ordinary skill in the art of making dental ceramics would know to alter these metal oxide compositions in order to change a physical property like that of viscosity. All the claimed elements were known in the prior art and one

skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of invention.

16. Regarding claims 27-28, the combination of Janjic and Brodkin do not teach wherein the ratio of SIO2 to AL2O3 or Na2O3 is lower in the second porcelain layer to the first porcelain layer.

r. However, it would have been obvious to one having the ordinary skill in the art that the viscosity can be experimented with to arrive to the claimed viscosity differentials. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The motivation for controlling the viscosity of the base layer ((1st porcelain layer) and a coating layer (2nd porcelain layer) is seen in the teachings of Toussaint. **(See column 3 lines 40-50)**.

xxi. Toussaint teaches that in general, the degree of strengthening achieved with an given base layer and a glass coating will depend on the viscosities of the two elements at the time they are joined together and for maximum results the viscosity of the coating (2nd layer) should be as low as possible, and the base layer (1st layer) should be as high as possible. **(See column 3 lines 40-50)**. Having the teachings of Toussaint, one having the ordinary skill in the art at the time of the invention would have

adjusted the composition of the porcelain layers of Janjic/Brodkin for the benefit of ensuring the viscosity differential between the two layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)*.

Response to Arguments

1. Applicant's arguments with respect to claims 1-10 and 20-22 and 24 have been considered but are moot in view of the new ground(s) of rejection.

2. **Applicant Argument #1**

a. Applicant argues that with respect to the Sozio reference, does not teach forming a cast coating by introducing porcelain under pressure.

3. **Examiner Response #1**

b. Examiner submits that a ram or a plunger is used by Sozio to inject the porcelain material into a mold cavity. **(See column 10 line 9 of Sozio)**.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMJAD ABRAHAM whose telephone number is (571)270-7058. The examiner can normally be reached on Monday through Friday 8:00 AM to 5:00 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on (571) 272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yogendra N Gupta/
Supervisory Patent Examiner, Art Unit 1791

AAA